



A MAL Architecture to Simulate Small Scale Fisheries

M. (Martin) Ngoby, Th. P. (Theo) van der Weide, W. T. (Wouter) De Groot and J. (Jose) Quenum

ICIS, Radboud University Nijmegen, Heyendaalseweg 135, 6525 AJ Nijmegen, The Netherlands.



Abstract

Agent-oriented platforms are becoming more diverse and sophisticated as there's increasing demand to design complex and dynamic systems. Therefore there's need to match the demand by developing architectures which can accommodate such dynamism. we propose the Multi-agent Lab(MAL) architecture in which the agents will exhibit cognitive notions of coordination, cooperation and competition.

Introduction and Motivation

Most agent-oriented architectures are designed to individually cater for a limited number of cognitive notions. The MAL architecture is to be developed in order to accommodate all the cognitive notions mentioned above usually in an open environment where a number of heterogenous agents interact with individual or collective goals/objectives.

Research Goals

- Determine techniques used to specify cognitive agents.
- Design an architecture for the cognitive agents to use the above techniques.
- Design a methodology for developing such an architecture.
- Explore the ideas in a larger context of ecosystem.
- Develop a policy decision making tool.

Proposed Approach

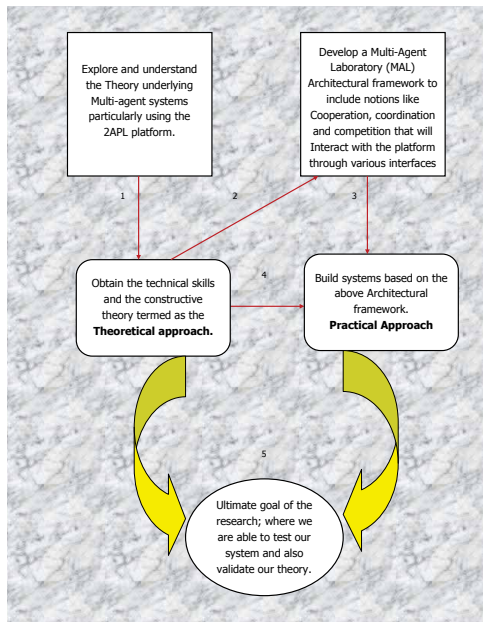


FIGURE 1: Research approach

Current Work

- Developing an application from Land Use using the **Action-in-Context(AiC)** methodology(De Groot, 1992).
- Develop features of AiC in comparison with the BDI model.

Action-in-Context Methodology

The AiC methodology is constructed out of:

- The action(s)
- The first-emergent decision-making social entities (the primary actors)
- The actors options, on one side, and the motivations (advantages and appropriateness) the actor attaches to these options on the other side.

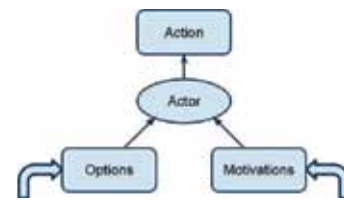


FIGURE 2: Action-in-Context framework

Actor's Field

- The actors' field affects the options and motivations of the primary actors.
- For instance, a farmer is the primary actor in the analysis of an agricultural land use system.
- The farmer has an option either to grow a cash crop or a subsistence crop.
- In the motivational structure, the accessibility to seeds and fertilizers are pivotal. Therefore we consider the "seed trader" a secondary actor etc

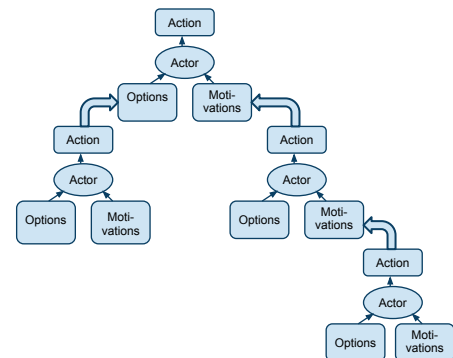


FIGURE 3: An Actors field structure in the Action-in-Context framework

Application

Modeling the ecosystem of part of Lake Victoria.



FIGURE 4: Lake Victoria, Uganda

Future work

- Improve theory.
- Build a prototype to later become a commercial tool.
- Find more applications.

References

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- [2] Wooldridge, M., Jennings, N. R.: Agent theories, architectures, and languages: In Wooldridge and Jennings, eds. Intelligent Agents, Springer Verlag, pp.1-22, (1995).
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